active ~~layer includes~~ multiple quantum wells, single quantum wells or double heterostructure.

7. The light emitting device of claim 1, wherein said substrate is doped with at least one impurity from the group consisting of chromium, titanium, iron, erbium, neodymium, praseodymium, europium, thulium, ytterbium and cerium.

8. The light emitting device of claim 1, wherein said active layer ~~emits~~ UV light and said substrate comprises sapphire doped with chromium, said substrate absorbing some of said UV light and re-emitting red light.

9. The light emitting device of claim 1, wherein said active layer emits yellow light and said substrate comprises sapphire doped with chromium, said substrate absorbing some of said yellow light and re-emitting red light.

14. The light emitting device of claim 1, wherein said active layer emits one color of light, said substrate doped throughout with more than one impurity such that it absorbs the light of said active layer and re-emits more than one color of light.

15. The light emitting device of claim 1, wherein said active layer emits UV light and said substrate is doped throughout with chromium, titanium, and cobalt, said doped substrate absorbing said UV light and emitting red, green, and blue light.

16. The light emitting device of claim 2, wherein said active layer emits UV light, and said substrate is doped by one or more rare earth or transition element in separate

color centers that absorb UV light and re-emit a different color of light, said bias selectively applied to a portion of said active layer above said color centers causing said active layer to emit light that will be primarily absorbed by said color center below said selectively biased portion of said active layer and re-emitted as a different color.

18. The light emitting device of claim 1, wherein said active layer emits UV light, and said substrate doped is by one or more rare earth or transition element in separate color centers, each said color center absorbs UV light and re-emits it as a different color.

25. A method for generating light from a solid state light emitting device, comprising:

providing a light emitting diode having an active layer surrounded by a pair of oppositely doped layer, all of which are disposed on a doped substrate;

exciting an optical emission from said active layer within a first wavelength range;

applying at least a portion of said optical emission to stimulate emission from said doped substrate within a different wavelength range; and

transmitting a combination of said optical emission and substrate emission as said LED's light.

26. The method of claim 25, wherein said doped substrate comprises sapphire, spinel, silicon carbide, gallium nitride, quartz YAGI, garnet, lithium gallate, lithium niobate, zinc oxide, or oxide single crystal.

27. The method of claim 25, wherein said substrate is doped with at least one rare earth or transition element.

28. The method of claim 25, wherein said substrate is

doped with at least one impurity from the group consisting of chromium, titanium, iron, erbium, neodymium, praseodymium, europium, thulium, ytterbium and/or cerium.

Please delete claims 10-13, 17, 19 and 20-23.

Please add the following claims.

30. A solid state light emitting device, comprising:

at least two active layers;

at least two pairs of oppositely doped layers, each of said active layers sandwiched between one of said pairs of oppositely doped layers, each of said pairs of oppositely doped layers causing its respective one of said active layers to emit light at a predetermined wavelength in response to an electrical bias across of said at least two pairs; and

a doped substrate, said active layers and said pairs of oppositely doped layers disposed on said substrate such that said substrate absorbs at least some of said light from at least one of said active layers and re-emits light at a different wavelength.

31. The light emitting device of claim 30, that emits a combination of light from said active layers and said substrate.

32. The light emitting device of claim 30, further comprising at least two pairs of electrical contacts, each of said at least two pairs of electrical contacts arranged to apply a bias across a respective one of said pairs of oppositely doped layers.

33. The light emitting device of claim 30, wherein each

of said active layers comprises multiple quantum wells, single quantum wells or double heterostructures.

Sub C8

34. The light emitting device of claim 30, wherein said substrate comprises sapphire, spinel, silicon carbide, gallium nitride, quartz YAGI, garnet, lithium gallate, lithium niobate, zinc oxide, or oxide single crystal.

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35. The light emitting device of claim 30, wherein said substrate is doped with at least one rare earth or transition element.

36. The light emitting device of claim 30, wherein said substrate is doped with at least one impurity from the group consisting of chromium, titanium, iron, erbium, neodymium, praseodymium, europium, thulium, ytterbium and cerium.

37. The light emitting device of claim 30, wherein the light emitting from said device comprises the light emitting from at least one of said active layers or the light emitting from at least one of said active layers in combination with the light emitted from said doped substrate.

38. The light emitting device of claim 30, comprising a LED, said active layers comprising three active layers emitting blue, green and UV light respectively, said substrate comprising sapphire doped with chromium which absorbs said UV light and re-emits red light, said LED emitting blue, green, UV and red light when all said active layers are emitting, in a white light combination.

39. The light emitting device of claim 30, comprising an LED wherein said active layers comprises three active

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layers emitting blue, green and UV light respectively, wherein each of said active layers can selectively emit light, said LED emitting primarily red, green, or blue light when one of said active layers is emitting, or said LED emitting primarily purple, aqua, yellow, or white light when more than one of said active layers is emitting.

C7

40. The light emitting device of claim 30, comprising a LED, said active layers emitting blue and yellow light, said substrate doped with chromium such that it absorbs at least some of said yellow light and emits red light.

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~~41. The light emitting device of claim 30, comprising a~~ LED, said active layers emitting one color of light, said substrate doped throughout ~~with~~ more than one impurity such that said ~~it absorbs~~ the light from said active layers, and ~~re-emit more than one color of light.~~

Sub C8

42. The light emitting device of claim 30, comprising a LED wherein said active layers emit UV light and said substrate is doped throughout with chromium, titanium, iron, and cobalt, said doped substrate absorbs said UV light and emits red, green, and blue light.

43. The light emitting device of claim 30, comprising an LED wherein said active layers emit UV light, and said substrate is doped by one or more rare earth or transition element in separate color centers that absorb UV light and re-emit a different color of light, said bias selectively applied to said active layers above said color centers causing said active layers to emit light that will be primarily absorbed by said color center below said active layers and re-emitted as a different color.

44. The light emitting device of claim 43, further

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comprising at least two pairs of electrical contacts each of said at least two pairs of electrical contacts arranged to apply a bias across a respective one of said pairs of oppositely doped layers above said color centers.

45. The light emitting device of claim 30, wherein said active layers emit UV light, and said substrate is doped by one or more rare earth or transition element in separate color centers, each said color center absorbs UV light and re-emits it as a different color.

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46. The light emitting device of claim 30, comprising a LED wherein said active layers emit blue light and UV light, said substrate absorbs at least some of said UV light and re-emits red light, said LED further comprising downconverting material around the surface of said LED that absorbs some of said blue light emitting from that surface and re-emits yellow light.

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47. The laser of claim 30, further comprising electrical circuitry integrated with said device on a common substrate.

48. A solid state laser, comprising:

an active layer;

a pair of oppositely doped layers on opposite sides of said active layer which cause said active layer to emit light at a predetermined wavelength in response to an electrical bias across said doped layers;

a doped substrate, said active and doped layers disposed successively on said substrate such that said substrate absorbs at least some of said light from said active layer and re-emits light at a different wavelength;

two mirrors arranged on opposing sides of the substrate, active and doped layers to cause stimulated emission of a combination of light from said substrate and said active layer as a collimated/coherent beam.

49. The laser of claim 48, wherein said active layers emits UV light and said substrate is sapphire doped with cobalt, said laser providing stimulated emission of UV and green light combined.

50. The laser of claim 48, wherein said active layers emit UV light and said substrate is sapphire doped with chromium, said laser providing stimulated emission of UV and red light combined.

51. The laser of claim 48, further comprising electrical circuitry integrated with said device on a common substrate.

REMARKS

Drawings

The drawings were objected to for failing to show every feature of the invention specified in the claims. The examiner noted that a substrate doped with iron as well as with Cr, Ti and Co must be shown or the features canceled from the claims. FIGs. 3 and 5 show a substrate doped with Cr, Ti and Co. Claim 15 has been amended to remove the reference to iron.

Claims

Objections

Claims 2, 10, 12 and 14 were objected to because of informalities relating to clerical errors and not for reasons related to patentability. The claims were amended